

Diseases of Babylon: an examination of selected texts

J V Kinnier Wilson MA FSA

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INTRODUCTION

This paper discusses from the viewpoint of modern medicine, and following an analysis begun in 1967¹, a further selection of the identifiable diseases which, certainly or suggestively, were prevalent among the populations of ancient Mesopotamia. Unlike the enviable situation of ancient Egypt there is as yet no palaeopathology for early Mesopotamia: accordingly, the evidence for conclusions reached derives entirely from many hundreds of cuneiform medical texts—from the diagnostic and prognostic series abbreviated to TDP after the current edition², from the practical or ‘therapeutic’ series known as AMT (Assyrian medical texts)³ and BAM (Babylonisch-assyrische Medizin)⁴, and from a number of shorter texts of individual kinds. Necessarily, certain original terms or phrases are included within the body of the account, both to provide authority for a statement and also to facilitate further enquiry. While treatment—and pharmacology—is not primarily of concern, the opportunity is taken to commend a valuable recent paper⁵ and other sources^{6–11} relating to work in this field.

As to the date of the texts, a unique Sumerian tablet from Nippur¹² may be dated palaeographically to about 2200 or 2100 BC, but the vast majority of the texts are ‘Akkadian’ and belong in their origins to the Old Babylonian period, or approximately 1900–1600 BC¹³. Preserved in the literary tradition, the texts of this period survive mainly in later copies: these include the Neo-Assyrian collection from Ashurbanipal’s library at Nineveh, and Middle and Neo-Assyrian tablets from Assur, the old religious capital of Assyria. A specific relevant date is that of the Babylonian king, Adad-apil-iddina, 1067–1046 BC. A new edition of the diagnostic texts was undertaken at this time¹⁴, so that the lower date provides a *terminus post quem* for diseases mentioned in the series. Some late medical texts from the Achaemenid period are also known¹⁵.

Further, it may be said that, despite the detail of their observations and the high quality of their work in the systematizing of knowledge, the Babylonians had little understanding of internal anatomy—for reasons that are not clear. Thus a term *libbu*, standing generally for the

‘internal system’, was used as required for the heart, stomach, womb and even occasionally the ‘mind’. There was no understanding of nerves and muscles: for the latter a word *šīru*, ‘flesh’, alone is found. Even the related term *šer’ānu*, known importantly as the seat of the pulse^{16,17}, served equally, as it would seem, to describe tendons and tissue as well as blood vessels. Our documents derive accordingly from a time before pathology, and here perhaps lies the main difference between this early medicine and that of the Greeks—little is known, or is discernible, of basic principles. Herein also, for the translator, lies a great problem, for since the technical vocabulary was limited, many of the ancient terms expressed a plurality of meanings by modern standards of precision. Such entities, for instance, as ‘eye disease’ or ‘lung disease’ we cannot penetrate, and a degree of anachronism will always be present in a modern translation.

Three general and two specialized studies^{18–22} may help to supplement the necessarily restricted compass of this paper. I now discuss what recent research may contribute to the history of disease in ancient Mesopotamia. The paper is intended as a typological study, and is presented under 10 headings.

AMOEBC DYSENTERY

A term *ridūt irrê*, deriving from *rēdu*, ‘to flow (of liquids)’, and *irrû*, ‘the intestines’, seems certainly to have expressed the condition of diarrhoea in Babylonian medicine. A related term *terdīt irrê* is found in the following prescription (BAM 99, 19f., and duplicates):

If blood is being discharged from the rectum of a man as from a woman with severe haemorrhage, and if, having examined him, you find that he does not have ‘anal disease’ (haemorrhoids) he is suffering from *terdīt irrê* (dysentery).

Even with the useful exclusion of the first condition, it is clear that other problems, such as ulcerative colitis, could well account for severe bleeding *per rectum* as seen by the ancient physician. One may, however, suggest that (amoebic) dysentery was often a cause. The suggestion is mainly supported by the geographical finding that today ‘amoebic infection is prevalent all over Iraq but more so in the southern provinces’²³, and by the occurrence of secondary liver abscess in Babylon (as seen in the following

Sometime Eric Yarrow Lecturer in Assyriology, University of Cambridge, Cambridge, England

Correspondence to: The Faculty of Oriental Studies, Sidgwick Avenue, Cambridge CB3 9DA, England

section). Treatments for rectal stricture, *hinq* or *hinqti šuburri*, occur also in the record^{24,25}.

OPERATION FOR LIVER ABSCESS

The history of liver abscess and its treatment in the Middle East necessarily includes the name of Abul-Qasim Al-Zahrawi (Abulcassis), who died AD 1013, and whose writings contain many detailed descriptions of surgical procedures²⁶. The Mesopotamian contribution is represented by BAM 39, 1–9, and AMT 49,4: iv 1–9. These sources produce a text which is still fragmentary at the present time, and of which the introduction is missing, but much of the procedure is preserved or may confidently be restored. The text reads as follows:

You will [count (upwards)] three ribs, open up [the abscess with an obsidian blade alongside the fourth rib, so cause the fluid and septic matter to escape]. . . . You heat together [fresh beer, honey and oil] and pour over. Prepare a lead cylinder and stitch on with a linen cloth. Knead fresh bread-flour into a dough with heated dill-water, (apply beneath the cylinder) and bandage.

The first sentence of this text was interpreted surgically over 40 years ago by the French Assyriologist, René Labat²⁷. He proposed that ribs in Babylonia were counted from the bottom upwards so that the initial incision was made between the 'third' and 'fourth' ribs and not, as it would be today, between the 'eighth' and 'ninth'. This hypothesis, Labat suggested, was the more believable since 'il est difficile, sinon par la radiographie, d'identifier exactement les côtes supérieures'. The 'lead cylinder' that is mentioned may also be recognized. It would correspond, in the draining process, to the skin-sutured rubber tubes of the older manuals—those written, that is, before the coming of amoebicides and needle aspiration.

From a damaged section of the text there is evidence that, to sweeten (?) the atmosphere, incense was to circulate or even 'swirl' (*sabā'u*) through the house from a time immediately before the operation.

PULMONARY TUBERCULOSIS

The existence of tuberculosis, especially tuberculosis of the spine or Pott's disease, is well established in ancient Egypt^{28,29}, and worldwide the history of the disease in all its forms claims over 100 pages of references in the recent *Cambridge World History*³⁰. So far as Mesopotamia is concerned the striking evidence of BAM 145, 1–23 with 146, rev. 29–42, is of relevance and important; its concern is with a named disease, *himiṭ šēti*, or 'šētu-fever':

If a man, thinking that the šētu-fever has come upon him, is very fearful and nervous; if his eyes wander about (*ittanasrahū*, interpreted through the Arabic *saraha* with this meaning) and his body suffers from exhaustion; if his body heat is not high but he has a frequent

cough, and as his system (*libbu*) becomes the more oppressed(?) sputum (*illātu*) begins to come; if his bowels writhe(?) from 'diarrhoea disease' and he suffers from diarrhoea; if externally his flesh is cold while underneath his bones burn with heat; if he gives up trying to go to sleep, and, with his windpipe becoming blocked, he gasps for breath and has 'fire-scorch' or(?) 'heart-scorch' in a number of places—that man is (indeed) afflicted with šētu-fever.

As may first be mentioned, it is not clear what 'šētu-fever' precisely means, but it was certainly not 'heat exhaustion' which was a proposal of earlier studies. Granted the translation this account suggests that the symptoms given are those of pulmonary tuberculosis with secondary tuberculosis of the intestines. This is likely to be the cause of the diarrhoea which is noted in the text. Otherwise, and in summary, the text presents a picture of anxiety, lassitude, low-grade fever, coughing, expectoration and dyspnoea. It is a somewhat circular argument which suggests that the 'scorch'-marks which are mentioned refer probably to cyanosis. The term in question occurs also in BAM 52: 39, being there associated with 'chest pain'.

It will be seen that there is no mention of haemoptysis in the presented text, but it is important for the theory in general that the diagnostic series at TDP 150: 40 has the entry:

If the patient has been ill for five days, and on the sixth day blood flows from his mouth, his illness will moderate; it is (a symptom of) šētu-fever.

One may note further that a paper on modern aspects of tuberculosis in Iraq, described as 'serious', draws attention to the place of 'helminthic infestation, malaria, bilharziasis, dysentery, avitaminosis and anaemia' in lowering the resistance of the people to the disease³¹. It is a reasonable proposition to suppose that the situation in antiquity was not dissimilar.

TUBERCULOUS MENINGITIS

A long ritual text, now available in copies provided by BAM 228, 229 and 323, describes a patient who is gravely ill:

He has headache attacks, his ears roar, his eyes are 'bright-and-staring' (*ibarrurā*, perhaps a stuporous condition), his neck tendons hurt him, his two sides (*variant*: 'one of his sides') have paralysis, his kidney-(region) hurts him, his mind is confused and he has difficulty in walking (lit.: 'his feet have *rimūtu*', that is, 'looseness', or a lack of controlled movement in the limbs).

It may be added that, at the beginning of the ritual, the patient was 'helped to sit down' in a special, reserved area. In parallel texts which involve a similar ritual the patient has to 'kneel down'. There would thus seem to be additional evidence for the leg trouble.

As to the main symptoms of the text the combination of headache, tinnitus and neck rigidity (an interpretation) is

good evidence for meningitis, and this I believe is both more likely to have been chronic than acute because of the difficulty in walking, and also more likely to have been tuberculous than bacterial if the stiffness or looseness in the legs was due to involvement of the spinal cord. Along such lines of reasoning the condition described may be interpreted as tuberculous meningitis with compression of the spinal cord and associated lumbar pain.

EPILEPSY

The Babylonian concept of epilepsy known as *miqtu*, or 'the fall(ing) disease', with recognizable equivalents to the grand mal, tonic and complex partial seizures of the modern terminology, and with descriptions also of auras (epigastric pain, paraesthesia), and post-ictal phenomena (confusional states, automatisms), has been discussed recently on the basis of a newly-recovered text of the diagnostic series³². A photograph of one side is reproduced in Figure 1. A transliteration and literal translation of the text, with additional commentary, is also now available³³.

DIFFICULT CHILDBIRTH

A phrase *ūlid-ma uštapšiq*, used of a woman who 'has difficulty in giving birth', had a prominent place in the Babylonian medical texts, and even the Sumerian term *la-ra-ah=pušqu*, 'dystocia'³⁴, descended into the literature from an early period. A number of prescriptions for the condition are known (AMT 67, 1: iv 6 ff.; BAM 248, iv 19 ff.), and a root extract mixed with (sesame) oil might be applied 'seven times in a downward movement over the lower part of the abdomen', *ibid.*, lines 13 and 20.

The question may be asked as to what anciently was meant by 'difficult childbirth'. It was the opinion of Alex Tulskey of Chicago (although he would not, I think, have claimed it as an original statement) that, in the deprived conditions of the times, the disorder will most often have involved a deformed pelvis, to which state inadequate diets, deficiency disease and osteomalacia may have contributed. Otherwise malpresentation may have been a common cause of the condition. Obstetric problems in early times are discussed more fully elsewhere³⁵.

Finally, miscarriage and abortion, and also perhaps the unyielding *la'bu*-fever which prevented child-bearing (cf. thus in Hammurabi's Code, §148), may often, one suspects, have been caused by hookworm disease which is well documented for modern, especially southern, Iraq^{23,36}.

SLEEP BRUXISM

A remarkable procedure advanced as a cure for adult grinding or gnashing of the teeth during sleep is provided by BAM 30, 47–53 and duplicate, here translated in full:

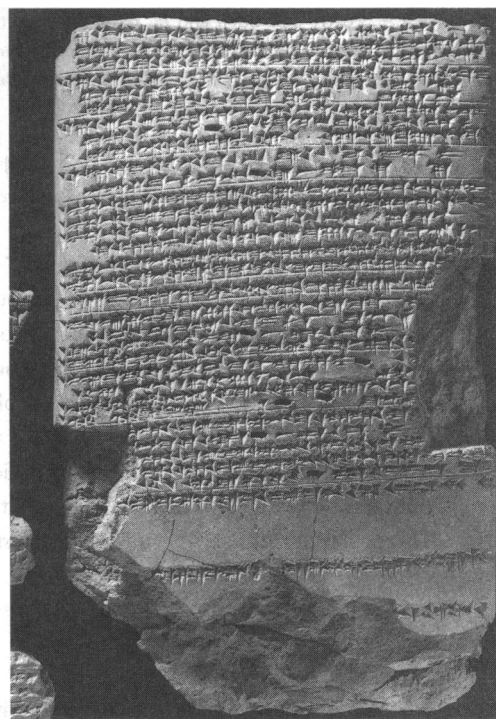


Figure 1 Reverse of the epilepsy tablet, BM 47753 (courtesy of The British Museum)

If a man grinds (or, 'grates') his teeth in his sleep, you will take a human skull, wash and anoint it with oil, and for seven days it shall be kept in place at the head of his bed. Before he lies down he shall kiss it seven times and lick it seven times—so he will recover.

The condition described is well known in medical literature. As defined in a recent study, 'sleep bruxism is a parasomnia characterised by stereotypic grinding or clenching of the teeth due to rhythmic masseter contractions'³⁷. These may occur 'hundreds of times' during the night although a variety of patterns occur. Medical help is often sought when bed or room partners complain of the sounds. In a large percentage of cases the persons concerned are mentally retarded.

One may look at the proposed treatment in two ways. From the Babylonian point of view the procedure would arguably have involved the principle of sympathetic magic, contact with the 'dead' hostility(?) of the skull inducing the 'death' of hostility in the person. From a modern point of view, as a colleague has suggested the nightly skull-licking will have become a source of such loathing and revulsion in the patient's mind as to create a desire for its cessation stronger than the desire to indulge in the original habit. Was the procedure often successful for the wrong reasons?

A REFLUX CONDITION

The interesting text of BAM 575, ii 35–37, reads in translation:

If a man's stomach is greatly distended and he regularly returns food and drink through his mouth, he must overcome the condition by his own efforts (*qaqqad-su irat-su išammad*, lit., 'he shall bandage his own head and his own chest'). Cakes of finely-ground flour he should bake, and these he should eat frequently *without honey, fats or leban. Every three days he should not eat onions, garlic, dill seeds, cress seed and aniseed; also he should not bathe. So he will recover.

Incorporating a textual correction ('without' for 'with', as thus indicated by the asterisk) the above prescription is clearly directed against over-eating, the avoidance of rich foods, spices and bathing (which would increase the appetite) being severely indicated. The bringing up of food and drink is not quite the same thing as 'vomiting' for which Akkadian has two separate verbs, but without an indication of pain one would not be justified in naming the condition as oesophagitis. The proposed 'dill seeds' (for a word *kasû*) is a new identification.

GANGRENE

The proposal is made on the basis of an entry in the diagnostic series (TDP 98: 54):

If the tips of his (the patient's) fingers are falling off (*imtiqtû*) and are black, he will die.

The statement must stand in isolation in the absence of other relevant information. There is as yet no evidence for diabetes in ancient Mesopotamia.

PERIAPICAL OSTEITIS

It is amusing to record that, according to an old Sumerian story, the world's first sufferer from toothache was the Earth god, Enki, who, on being asked at some early time by his sister, 'My brother, what hurts you?', replied: *zû-mu ma-gig*, 'My teeth hurt me'.

In the therapeutic texts two Tablets are devoted to dental problems, there being many references to toothache and its treatment, to weak or loose teeth, and to the ravages of the 'tooth-worm', in fact a somewhat international figure in early dentistry. But so far at least as Egypt is concerned the main problem was not decay. It was the rapid and intense wear of the teeth, causing exposure of the pulp and allowing infection to pass down through the roots with the subsequent forming of abscesses and the eventual destruction of the attachment of the teeth³⁸. That Mesopotamia suffered also from this or related trouble is indicated by the incantation of BAM 538, iv 40f., with AMT 23, 6: 8ff. It begins:

The flesh being a 'door', the bone (beneath) its 'bar',
(The Worm) has 'entered' [the flesh], has 'lifted up' the bone;
(Yea), she has bitten through the flesh, has du[*g* into] the bone,

Among the teeth she has made her *s[eat, from] the (very) bottom to the top of them.

This interesting quatrain—which is indeed poetry (of a sort)—evidently confronts a quite serious dental problem. The fact that it was the subject of an incantation may also suggest that the condition lay beyond the reach of other treatment. What is particularly noticeable is that the word 'bone' occurs three times in the text. One may think accordingly that 'osteitis' should feature in the diagnosis, and indeed in a well-known study of the palaeopathology of teeth and jaws from ancient Egypt and other peoples, Alexandersen stated that, 'in old age, attrition and periodontal disease may lead to osteitis throughout the dentition'³⁹. The same writer affirmed also that 'the resorption of bone caused by periapical osteitis will, after an elapse of time of varying length, remove the bony cover of the roots'—and such would seem to be an appropriate commentary for line 2 of the incantation where the Worm has 'lifted up the bone'.

As to the reason why the teeth should have become so worn down in the first place there is now some agreement that, for Egypt, this will have been mainly due to the presence in foods of fine silicate dust, arising either from the use of mill stones and flour grinders, or wind-blown from the desert³⁸. The same explanation may serve for Babylon.

ADDENDUM

It has been suggested that the above statement might usefully include a summary of the more important diseases discussed in *Diseases in Antiquity*¹.

The statement began with a discussion of deficiency diseases in ancient Mesopotamia. These included day- and night-blindness and xerophthalmia: the case for both of these has recently been restated, even 're-discovered'⁴⁰. Scurvy was seen as one meaning of the term *bu'sānu*, lit., 'the evil-smelling disease'; it is classified in the therapeutic texts with disorders of the teeth. A second meaning of 'diphtheria' is agreed by both the writer and Köcher⁴¹, and indeed, *bu'sānu* with lung infection as given in BAM 558 may thirdly have indicated bronchiectasis, the expelled sputum in this condition being very foetid and offensive.

The most obvious helminthic disorder was seen as ascaris infection, and an association with jaundice suggests hepatic ascariasis. Bilharzia disease or urinary schistosomiasis is of certain occurrence in ancient Egypt^{42,43}, and encouraged by the discovery of bulinus shells in certain archaeological contexts in Iraq⁴⁴, the disease was thought to have been called *mūšu*; in Mesopotamia this term in the urinary texts is associated with haematuria and 'stones' (calculi), and elsewhere with stricture (*hiniqtu*). Typhoid as a disease of infancy was discussed, also cutaneous leishmaniasis or 'Baghdad boil'—already as 'Balkh sore' traced historically

to the time of Avicenna⁴⁵. Trachoma, which shows a high incidence in modern Iraq⁴⁶, was seen only on the basis of the secondary evidence of entropion; however, two subsequent studies have addressed the problem, and, if not immediately compelling, deserve careful attention^{47,48}.

A re-statement on 'leprosy' may complete this review. A cited entry from a physiognomical omen text states that

If the skin of a man exhibits whiteness or is marked with 'nuqdu-dots' he has been rejected by his god and is to be rejected by men.

The interpretation of this text supposed that a contrast was being made between nerve and nodular leprosy, the notice of 'rejection' implying excommunication. However, it has been objected that the physiognomical omnia relate essentially to marks and conditions, etc., which have persisted from birth⁴⁹ and are 'relatively innocent'⁵⁰, so that 'a severe disease like leprosy does not belong here'.

These objections are accepted as valid, although whether the 'whiteness' of the text should now be interpreted in terms of leucoderma, 'common in native races' and 'popularly mistaken for leprosy'⁵¹, it would be difficult to say (an 'Indian' origin for the Sumerians might possibly support this proposal). In any case it would seem that leprosy, despite major research, still preserves its elusive secrets. As one authority has remarked: 'In what period of human history *M. leprae* appeared, and from what other mycobacterial species it evolved, are a mystery'⁵².

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REFERENCES

- Kinnier Wilson JV. Organic diseases of ancient Mesopotamia, and Mental diseases of ancient Mesopotamia. In: Brothwell D, Sandison AT, eds. *Diseases in Antiquity: A Survey of the Diseases, Injuries and Surgery of Early Populations*, Chaps 15 and 56. Springfield, Illinois: Charles C Thomas, 1967
- Labat R. *Traité akkadien de Diagnostics et Pronostics médicaux*. Leiden: E J Brill, 1951
- Thompson RC. *Assyrian Medical Texts From the Originals in The British Museum*. Oxford: Oxford University Press, 1923
- Köcher F. *Die babylonisch-assyrische Medizin in Texten und Untersuchungen*, Bd I–VI. Berlin: Walter de Gruyter, 1963–1980
- Powell MA. Drugs and pharmaceuticals in ancient Mesopotamia. In: Scarborough J, ed. *Studies in Ancient Medicine, The Healing Past: Pharmaceuticals in the Biblical and Rabbinic World*, Vol. 7. Leiden: E J Brill, 1993:47–67
- Thompson RC. *A Dictionary of Assyrian Botany*. (A posthumous volume, completed and edited by C J Gadd.) London: The British Academy, 1949
- Köcher F. *Keilschrifttexte zur assyrisch-babylonischen Drogen- und Pflanzenkunde*. Berlin: Akademie-Verlag, 1955:5–9 (Inhaltsübersicht)
- Townsend CC, Guest E. *Flora of Iraq*, Vols I–IX (incomplete). Baghdad: Ministry of Agriculture, 1966
- Chakravarty HL. *Plant Wealth of Iraq: A Dictionary of Economic Plants*, Vol. I (Vol. II not published). Baghdad: Botany directorate, Ministry of Agriculture and Agrarian Reform, 1976
- Hooper D, Field H. *Useful Plants and Drugs of Iran and Iraq*. Botanical series, Field Museum of Natural History, Vol. 9, No. 3. Chicago: Field Museum of Natural History, 1937
- Postgate JN, Powell MA, eds. *Bulletin on Sumerian Agriculture* [Selected papers], from Vols I–VI. Cambridge: Sumerian Agricultural Group, Faculty of Oriental Studies, 1984–1992
- Civil M. Prescriptions médicales sumériennes. *Rev Assyriol Archéol Orientale* 1960;54:57–72 (with photographs 58–59)
- Oppenheim AL. Mesopotamian Medicine. *Bull Hist Med* 1962;36:97–108
- Finkel IL. Adad-apla-iddina, Esagil-kin-apli, and the series SA.GIG. In: Leichty E, Ellis M, Gerardi P, eds. *A Scientific Humanist: Studies in Memory of Abraham Sachs*. Philadelphia: The University Museum, 1988:143–59
- Hunger H. *Spätbabylonische Texte aus Uruk*, I. Ausgrabungen der Deutschen Forschungsgemeinschaft in Uruk-Warka, Band 9. Berlin: Gebr Mann Verlag, 1976
- Oppenheim AL. On the observation of the pulse in Mesopotamian medicine. *Orientalia* 1962;31:27–33
- Kinnier Wilson JV. The Nimrud catalogue of medical and physiognomical omnia. *Iraq* 1962;24:60–2
- Oppenheim AL. Medicine and physicians. In: *Ancient Mesopotamia: Portrait of a Dead Civilization*, Chap VI. Chicago: University of Chicago Press, 1964:288–305
- Herrero P, Sigrist M. In: Herrero P, ed. *La thérapeutique mésopotamienne*, Mémoire 48. Paris: Editions Recherche sur les Civilisations; 1984
- Biggs RD. Medizin in Mesopotamien. In: Edzard DO, ed. *Reallexikon der Assyriologie und vorderasiatischen Archäologie*, Bd 7. Berlin: Walter de Gruyter, 1992: 623–629 (with references cited)
- Ritter EK. Magical-expert (*āšipu*) and physician (*asû*); notes on two contemporary professions in Babylonian medicine. In: *Studies in Honor of Benno Landsberger*. The Oriental Institute, Assyriological Studies, No. 16. Chicago: University of Chicago Press, 1965:299–321
- Durand J-M. Archives épistolaires de Mari I/1, Part VI: Maladies et médecins. In: *Archives Royales de Mari, XXVI*. Paris: Éditions Recherche sur les civilisations, 1988:543–60
- Nor El-Din J. Report on ancylostomiasis survey in Iraq, 1954, with an appendix on the incidence of other intestinal parasites in Iraq. *Bull End Dis (Iraq)* 1958;2:117–37
- Oppenheim AL, ed. *The Assyrian dictionary of the Oriental Institute of the University of Chicago*, Vol. 6. Chicago: The Oriental Institute Glü: J J Augustin, 1956:195
- von Soden W. *Akkadisches Handwörterbuch*. Wiesbaden: Otto Harrassowitz, 1959–1981:347
- Shakir RA. Medicine in the Arab world. In: Walton J, Baroness JA, Lock S, eds. *The Oxford Medical Companion*. Oxford: Oxford University Press, 1994:578–9
- Labat R. À propos de la chirurgie babylonienne. *J Asiatique* 1954;242:216–18
- Cave AJE. The evidence for the incidence of tuberculosis in ancient Egypt. *Br J Tuberc* 1939;33:142
- Morse D, Brothwell D, Ucko PJ. Tuberculosis in ancient Egypt. *Am Rev Resp Dis* 1964;90:524
- Kiple KF, ed. *The Cambridge World History of Human Disease*. Cambridge: Cambridge University Press, 1993
- Al-Imari AJ. Pulmonary Tuberculosis in Iraq. *J Fac Med Baghdad* 1955;19:112

- 32 Kinnier Wilson JV, Reynolds EH. Translation and analysis of a cuneiform text forming part of a Babylonian treatise on epilepsy. *Med Hist* 1990;**34**:185–98
- 33 Stol M. *Epilepsy in Babylonia*. Cuneiform Monographs 2. Groningen: Styx Publications, 1993
- 34 Civil M. Medical commentaries from Nippur. *J Nr East Stud* 1974;**33**:331
- 35 Wells C. Ancient obstetric hazards and female mortality. *Bull NY Acad Med* 1975;**51**:1235–49
- 36 Farjo PD. The incidence of Ancylostomiasis in Iraq. *Bull End Dis (Iraq)* 1960;**3**(3,4):29–35
- 37 Dyken ME, Rodnitzky RL. Periodic, aperiodic, and rhythmic motor disorders of sleep. *Neurology* 1992;**42**(suppl 6):70
- 38 Strouhal E. *Life in Ancient Egypt*. Viney D, transl. Cambridge: Cambridge University Press, 1992:248
- 39 Alexandersen V. The pathology of the jaws and the temporomandibular joint. In: Brothwell D, Sandison AT, eds. *Diseases in Antiquity*. Springfield, Illinois: Charles C Thomas, 1967:580
- 40 Stol M. Blindness and night-blindness in Akkadian. *J Nr East Stud* 1986;**45**:295–9
- 41 Köcher F. Spätbabylonische medizinische Texte aus Uruk. In: Habrich C, Marguth F, Wolf JH, eds. *Medizinische Diagnostik in Geschichte und Gegenwart*. Munich: Werner Fritsch, 1978:20–1
- 42 Ruffer MA. Note on the presence of Bilharzia haematobia in Egyptian mummies of the Twentieth Dynasty (1250–1000 B.C.). *BMJ* 1910;**177**:16
- 43 Miller RL, Armelagos GJ, Ikram S, De Jonge N, Krijger FW, Deelder AM. Palaeoepidemiology of *Schistosoma* infection in mummies. *BMJ* 1992;**304**:355–6
- 44 Zakaria H. Historical study of *Schistosoma haematobium* and its immediate host, *Bulinus truncatus*, in central Iraq. *J Fac Med Baghdad* 1959;**1**(NS):2
- 45 Pringle G. Oriental sore in Iraq: historical and epidemiological problems. *Bull End Dis (Iraq)* 1957;**2**:41–76 (esp 43–4)
- 46 Kuhnke LaV. Disease ecologies of the Middle East and North Africa. In: Kiple KF, ed. *The Cambridge World History of Human Disease*. Cambridge: Cambridge University Press, 1993:459
- 47 Stol M. Old Babylonian ophthalmology. In: Lebeau M, Talon Ph, eds. *Reflets des Deux Fleuves: Volume de Mélanges offerts à André Finet*. Akkadica, supplementum VI. Leuven: Peeters, 1989:163–6
- 48 Adamson PB. An assessment of some Akkadian medical terms. *Rev Assyriol Archéol Orientale* 1993;**87**:156
- 49 Köcher F. *Saharšubbû*—zur Frage nach der Lepra im Alten Zweistromland. In: Wolf JH, ed. *Aussatz—Lepra—Hansen-Krankheit: ein Menschheitsproblem im Wandel*. Würzburg: verlegt vom Deutschen Aussätzigen-Hilfswerk, 1986:27–34
- 50 Stol M. Leprosy: new light from Greek and Babylonian sources. *Jaarb Vooraziatisch-Egyptisch Genoots (Ex Oriente Lux)* 1987–88;**30**:22–31
- 51 Manson-Bahr PH. *Synopsis of Tropical Medicine*, 2nd edn. London: Cassell, 1952:160
- 52 Carmichael AG. Leprosy. In: Kiple KF, ed. *The Cambridge World History of Human Disease*. Cambridge: CUP, 1993:836

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